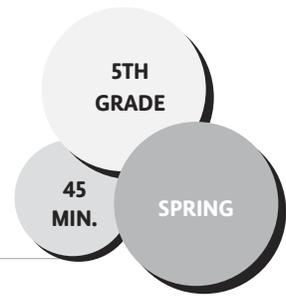


Break It Down

THEME: GROWING AND ACCESSING HEALTHY FOOD



ESSENTIAL QUESTION

How is composting beneficial to our garden and our earth?

LEARNING OBJECTIVES

- ✓ Students will be able to describe the movement of matter among plants, animals, decomposers, and the environment.
- ✓ Students will be able to build a compost pile and explain the value of compost in a garden.

CONCEPTS

biodegradable carbon compost
decomposition nitrogen tool safety

Engaging the Classroom Teacher

- Prior to the lesson, ask the teacher about students' familiarity with decomposition and the elements carbon and nitrogen.
- Ask the teacher whether they have four or five established groups of students who work well collaboratively.
- During Action Step 5, suggest that the teacher supervise groups bringing materials over to the compost pile as you supervise work happening on the pile.

LESSON DESCRIPTION

In this lesson, students practice identifying and sorting biodegradable objects before they work in teams to learn how to build a compost pile in the school garden. This lesson is designed to be taught in conjunction with lessons Rotting Away, Day by Day and Cycle of a Nutrient.

MATERIALS

- Vinyl tablecloth
- 5–10 biodegradable items for display (try to have a variety of items, including items students may not immediately think of, such as a piece of a burlap sack, newspaper, or cotton shirt)
- 5–10 nonbiodegradable items such as plastics and cans
- Building and Maintaining a Compost Pile Poster (p. 587)
- Watering cans or hose
- 1–3 wheelbarrows
- Shovels
- Digging forks
- Hand shears
- 3 wheelbarrows' worth of green compost materials, such as kitchen scraps, grass clippings, noninvasive weeds, or crop debris
- 3 wheelbarrows' worth of brown compost materials, such as straw, dried leaves, berry canes, or other branches
- 1 wheelbarrow worth of garden soil

PREPARATION

- › Scout a location for your compost pile in the school garden. Be sure it is close to a water spigot and easily accessible for hauling

materials. Indicate the blueprint of your pile by laying branches to create a square, three feet by three feet.

- › Collect a variety of biodegradable and non-biodegradable materials for in-class sort.
- › Have some green and brown layers already broken down into six-inch pieces.
- › Designate a mound of garden soil to freely add to your compost pile.
- › Consider leading Action Steps 1 and 2 indoors if you don't have a designated outdoor space for gathering, anticipate students may be distracted, or the weather may not be warm enough to be sitting still for long.

ACTION STEPS

1. Sorting Biodegradable Objects: Gather students in a circle. Have a vinyl tablecloth in the middle of the circle, arranged with a mix of biodegradable and nonbiodegradable materials. Tell students that half of the materials have something in common with one another, and it's their job to figure out with the person sitting next to them what that characteristic is. Pick up two objects, for instance an apple core and an aluminum can, and say, *This one is, waving the apple, but this one isn't, waving the can.* Tell students to whisper with their partner to figure out the rule. If they figure it out, they should keep it a secret but raise their hands to show another example to the class. Continue having different pairs choose items and say, *This one is, but this one isn't,* until everyone in the class has caught on. **(5 min.)**

2. Revealing the Rule: Call on students to reveal the mystery rule. Students might say these things are biodegradable or are

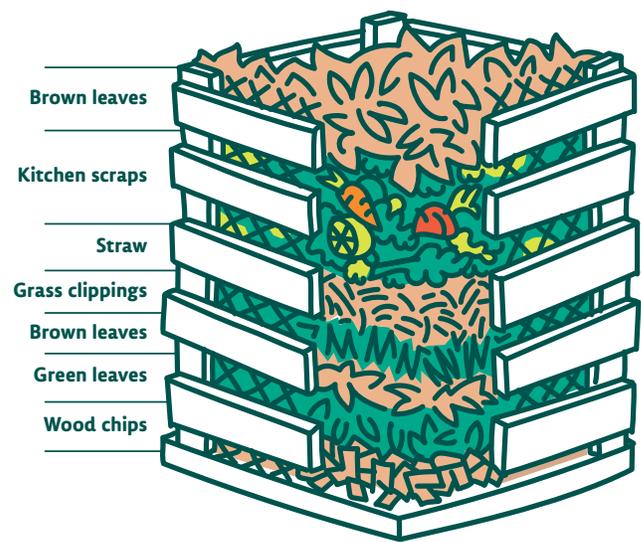
compostable, or come from nature, or were once alive. If students haven't already made the connection to decaying organic material, say something like, *So that means that anything decomposable would have been alive at some point.* Or ask students, *Which of these things were once living?* Explain, *All things that were once alive break down into their basic elements with the help of decomposers. When this happens, we get compost, which can be added to the soil to help grow more plants.* Explain to students that today they'll be building a compost pile. If you've already taught the lesson Cycle of a Nutrient, make the connection by explaining that the compost pile will help us do our part in cycling the nutrients in our food waste and garden debris. **(10 min.)**

3. Model: Gather students outside, and demonstrate building a mini compost pile. Consider having students build their own mini compost pile as you model, using just a handful of the required material for each layer. Alternatively display or pass out Building and Caring for a Compost Pile Poster for students who would benefit from this additional visual. First, create a layer of broken sticks, explaining that this will help water drain from the pile so it's not too wet. Add a layer of greens and sprinkle with water. Explain the following: *This green layer, whether it's food waste, grass clippings, or weeds, adds nitrogen to our compost pile. Add a layer of browns and sprinkle with water. Explain the following: These woody materials such as straw, branches, or dried brown leaves are a source of carbon for our compost pile.* Add a layer of garden soil and sprinkle with water. Remind students of the following: *Though we might not see them, there are microorganisms in soil that are decomposers,*

just like worms, that will help break down the materials in our compost pile and help release all the good nutrients they hold. We add water because the microorganisms need water to stay alive, just like we do. **(10 min.)**

4. Demonstrate Tool Safety! Remind students that using garden tools is a responsibility and to keep tools low and be aware of their classmates as they're working. Model with students how you want them to hold and move with their tools, and let them know where tools should be placed when not in use. Emphasize and demonstrate how to keep the sharp or metal end of the tool below your waist at all times. **(5 min.)**

5. Building a Compost Pile: Divide students into four teams—Greens, Browns, Water, and Soil. Have a station where each group will work (i.e., a station for Green and Brown teams to cut up garden debris into smaller six-inch chunks and a mound of garden soil for the Soil team to shovel from). Depending on the size of your class, you might have a fifth group in charge of maintaining the compost pile with digging forks so that it stays square and level, or you can add that responsibility to the Water team. Explain to students that you'll call out when you need that team, and two representatives from the team can bring over materials while the rest of the team continues working to create smaller pieces. Monitor students working with tools as you're calling Greens or Water for the next step in the compost pile. Repeat until you've used all your materials and/or your pile is three feet tall. Be sure to end with a layer of soil. **(15 min.)**



REFLECTION

Have students discuss the following questions in small groups, then share with the class: **(5 min.)**

Social and emotional learning

- *What strategies worked best when we were making our compost pile? What could have worked better?*
- *Ask yourself: Was I safe and responsible using tools in the garden today?*
- *Ask yourself: Did I work well with my team?*
- *Ask yourself: How did I contribute to making the compost pile?*

Check for understanding

- *What are the layers in our compost pile? What purpose does each ingredient serve? What other ingredients could we have used?*
- *What do you think our compost pile will look like if we dig into it in a week? In a month? In six months?*
- *What strategies worked best when we were making our compost pile? What could have worked better?*

ADAPTATIONS

Tasting: Have students create edible compost piles to reinforce the idea of layering green nitrogen-rich materials with brown carbon-rich materials. You can use crackers, nut butter, and greens.

Cafeteria Extension: Set up a station in the cafeteria for collecting compostable food scraps. Have students rotate to monitor the collection station and to add these scraps to the compost pile in the garden.

Classroom Extension: Have students visit the compost pile every couple of weeks to observe and record what living creatures are present. Students can even track a particular piece of garden debris or food waste, such as an apple core, to see how quickly it is decomposing. If you have a compost thermometer, have students record the temperature and graph the change over time as the pile heats up and then the temperature levels off.

Follow-Up: Be sure to involve students in maintaining the compost pile. Every three weeks, check the moisture level—it should be as wet as a wrung-out sponge. Turn your compost by putting the top layer on the ground beside your original pile. Keep transferring layers to the new pile until the bottom of the old pile is now the top of the new pile.

ACADEMIC CONNECTIONS

Next Generation Science Standards
Life Science Disciplinary Core Idea

NGSS.LS.2.A

The food of almost any animal can be traced back to plants. Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants, while decomposers restore some materials back to the soil.

BUILDING AND MAINTAINING A COMPOST PILE

1. First, put down a layer of sticks. (for sticks to drain through).



2. Add a layer of green and sprinkle with water.



3. Add a layer of browns and sprinkle with water.



4. Add a layer of garden soil and top with water.



5. Repeat!



(Greens: food waste, grass clippings, weeds, garden debris, manure)

(Browns: straw, branches, brown leaves, shredded cardboard)

MAINTAIN YOUR COMPOST PILE

1. Add new layers!
2. Stir or turn your pile every so often.
3. Keep it moist, but not too wet.

